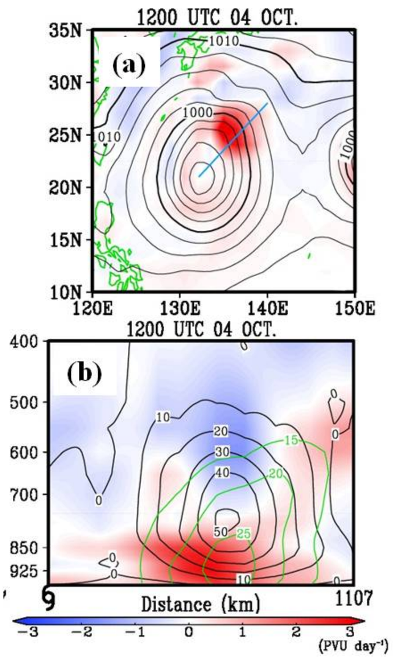
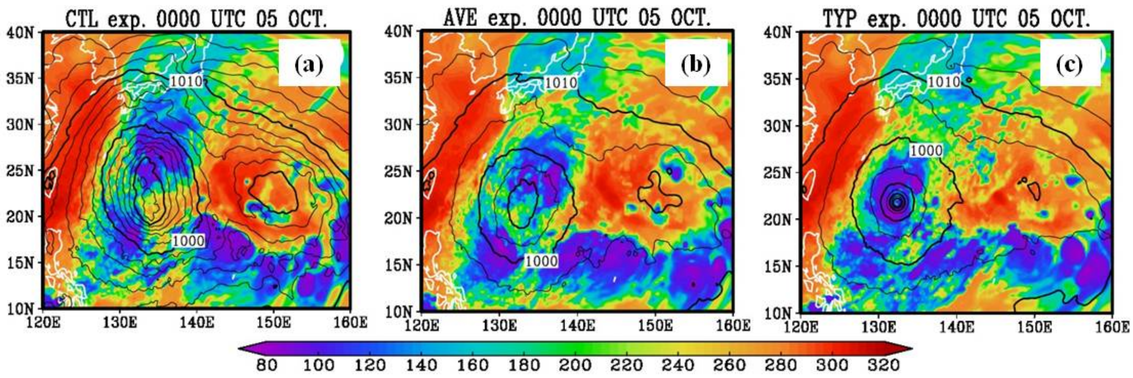
Arakane, S., M. Satoh, and W. Yanase, 2014: Excitation of deep convection to the north of tropical storm Bebinca (2006). *J. Meteor. Soc. Japan*, **92**, 141–161.
http://dx.doi.org/10.2151/jmsj.2014-201



← Figure 1. (a) Diabatic PV generation rate at 925 hPa (color, PVU day^{-1}) and SLP (contour, every 2 hPa). (b) Vertical cross section of diabatic PV generation rate (color, PVU day^{-1}) and diabatic heating rate (black contour, K day^{-1}). The green contours indicate the horizontal wind perpendicular component to the section of 15, 20, and 25 $m\ s^{-1}$. The location of cross-section is indicated in Fig. 1a and the position of the left edge of abscissa is the center of Bebinca.

↓ Figure 2. OLR distributions of 24-h numerical simulations. (a) Control experiment, (b) AVE experiment using tangential averaging vortex structure, (c) TYP experiment using tropical cyclone bogus scheme.



- This study investigates the excitation of deep convection concerning the case of unusual extratropical transition (ET) of Tropical storm Bebinca (2006). The deep convection was formed to the north of Bebinca during ET of Bebinca first, and the convection strengthened and became a new cyclone. Thus, the cyclone center defined as the minimum sea level pressure appeared to be shifted from Bebinca to the new cyclone drastically.
- The analyses elucidate mechanisms for excitation of deep convection, including a high convective available potential energy environment due to moisture convergence at lower levels, potential vorticity generation by a diabatic Rossby vortex mechanism (Fig. 1), and dynamical forcing formation of upward motion induced by upper levels.
- Numerical simulations, including sensitivity experiments in which the vortex structure of Bebinca was changed, suggested that the Bebinca's unusual vortex structure, which is the weak pressure gradient near the center, was fundamental for the excitation of the deep convection (Fig. 2).